

Faculty of Engineering & Technology

Microwave Engineering

Information :

Course Code : COM 415

Level : Undergraduate

Course Hours : 3.00- Hours

Department : Specialization of Electronics & Communication

Instructor Information :

Title	Name	Office hours
Professor	Mahmoud Abdelrahman Abdelfattah Abdallah	4
Teaching Assistant	Hamdy Sherif Hamdy Amin Elshehaby	

Area Of Study :

- Enrich students knowledge about the different field expressions.
- Prepare students to differentiate between different kinds of waveguides and cavity resonators.
- Train students to identify different types of microwave filters & micro-strip lines used in their design.

Description :

Equivalent circuit of waveguides: N-port circuit, circuit description, scattering parameters, excitation of wave guides, waveguides coupling by aperture, Passive devices: terminations, attenuators, phase shifters, directional couplers, Hybrid junctions, Circuit theory of resonators, Fabry Perot and optical resonators, Microwave measurements, detection and measurement of microwave power, measurement of wavelength, and measurement of impedance. Ferrites

Course outcomes :

a. Knowledge and Understanding: :

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| 1 - | a1. Describe different elements of microwave systems. |
| 2 - | a2. Summarize design problems for waveguides cavity resonators and filters. |

b. Intellectual Skills: :

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| 1 - | b1. Develop ideas in structural and mathematical terms so that quantitative evaluation is facilitated. |
| 2 - | b2. Create solutions for microwave networks |
| 3 - | b3. Evaluate obtained results both individually or as a part of team. |

c. Professional and Practical Skills: :

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| 1 - | c1. Application of microwave slotted line. |
| 2 - | c2. Measurements of dielectric constants of different dielectric materials. |

d. General and Transferable Skills: :

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| 1 - | d1. Work coherently and successfully as a part of a team in the Lab., projects, and assignments. |
| 2 - | d2. Communicate Effectively. |

Course Topic And Contents :

Topic	No. of hours	Lecture	Tutorial / Practical
Waveguides- planar	5	3	2
Modes (TEM, TE, and TM) general field equations	5	3	2
Rectangular Waveguide, Circular Waveguide (modes, power, attenuation 1st Midterm	15	9	6
Cavity resonators: resonance frequency- quality factor	15	9	6
2nd Midterm Filters- insertion loss- maximally flat, equal ripple- LPF, HPF, BPF, and BSF	15	9	6
Impedance . Frequency scaling, and implementation	20	12	8

Teaching And Learning Methodologies :

Interactive Lecturing

Discussion

Problem Solving

Experiential Learning

Recommended books :

R.E.Collin, " Foundation for Microwave Engineering" Wiley, 2001